shallcross

A CUTLER-HAMMER COMPANY

OPERATING & MAINTENANCE INSTRUCTIONS

SHALLCROSS NO. 670-A MILLIOHMMETER

SHALLCROSS, SELMA, NORTH CAROLINA
ZIP CODE 27576 • TEL. 919/965-2341 • TWX 510-920-0740

Operating Instructions - Pages 1 & 2
Calibration - Page 3
Schematic - Page 4
Wiring Diagram - Page 5
Spare Parts List - Page 6

OPERATING & MAINTENANCE

INSTRUCTIONS

SHALLCROSS NO. 670-A

MILLIOHMMETER

OPERATING INSTRUCTIONS

SHALLCROSS NO. 670-A MILLIOHMMETER

1. Connect resistance to be measured to the binding posts marked Probe I and Probe II in the normal Four Terminal Method of Low Resistance Measurements.

2. Turn switch to "ON" position and "OHMS FULL SCALE" selector to the proper range.

3. If the "OHMS FULL SCALE" selector is set to either the 0.1 Ohm or 0.5 Ohm position adjust the meter to the Red Line by turning the knob marked "ADJUST". For all other selector positions adjust the meter to Full Scale.

4. The value of the resistance being tested is obtained by depressing the "TEST" switch and reading the result.

5. If the value of the resistance being tested is unknown place the selector switch on 0.5 Ohm range and in descending order change the range until the largest deflection is obtained when the "TEST" switch is depressed.

6. (See Page 2)

BATTERY POWER: Normal battery supply is 3V. This may be obtained from 2 Dry Cells connected in series. Standard No. 6 batteries will fit in the compartment provided. For production testing this instrument should be operated from a 4 Volt storage battery; two cells of a regular 6 Volt storage battery may be used. Red lead goes to Plus Terminal in all cases, Black lead to Minus.

ELECTRICAL TEST

SHALLCROSS MFG. CO.
SELMA, NORTH CAROLINA

MECHANICAL TEST

6. Although we do not recommend it, the milliohmeter can be used with 4 lead wires in place of the 657-B & 676_B assemblies. When 4 separate leads are used, care should be taken to see that the current and potential leads on the upper side of the meter are used on one side of the resistance to be measured, and the two leads on the lower side go to the other side of the resistance. Reversing the current or potential leads will result in reverse polarity of the meter. When the 657-B & 676-B probes are used, the terminal blocks are wired in such a manner that reverse polarity can not be obtained.

CALIBRATION OF SHALLCROSS

NO. 670-A MILLIOHMMETER

ROUTINE CHECKS. Routine checks on the reliability of the indications are obtained by using test standard resistors. Check the 0.005 ohm range against a suitable standard of 2% accuracy or better. The reading should be accurate to within 5% of full scale or within $2\frac{1}{2}$ scale division at any point on the scale. If the reading is not accurate, the following calibration procedure should be used.

CALIBRATION PROCEDURE: (See Diagram BM-25450 & BM-25876)

a. Unsolder one lead of the meter protecting resistor (9) and check its value on a Wheatstone Bridge. It should be 100 ohms ± 1%. Resolder the leads.

b. If all ranges are in error in the same direction (all high or low) it may be possible to correct all ranges by changing the value of resistor R2 (0.15 ohm). For high readings (0.0025 standard readings 0.00258) decrease the value of the resistor R2. (See Diagram BM-25450 & BM-25876)

c. Check the 0.001 ohm range against 0.001 ohm standard. If the full scale reading is out of tolerance substitute a resistance box for the R3 resistor. Adjust the resistance box to secure a value which will bring the 0.001 ohm range within tolerance.

d. Repeat the test on the 0.005 ohm range and if it is out of tolerance change the value of resistor R4 to bring the range within tolerance.

e. To correct the other ranges repeat the procedure outlined above and change the value of resistor R5 for the 0.01 ohm range; resistor R6 for the 0.05 ohm range; etc., until all ranges are corrected.

ITEM NO.	DESCRIPTION	TYPE OR DRAWING NO.	REQ'D.		
	Resistor, 0.15 ohms P/M .5% (Mangamin bus)	AM-25839	1		
	Resistor, 40 ohms P/M 0.1% Calibrate to meter	245-S	1	.0071	K ML
	Resistor, 50 ohms P/M 0.1% Calibrate to meter	245-S	1	.0089	E ML
	Resistor, 100 ohms P/M 1% Calibrate to meter	245-S	1	.0071	E ML
	Resistor, 400 ohms P/M 0.1% Calibrate to meter	245-S	1	.0045	E ML
	Resistor, 2400 ohms P/M 0.1% Calibrate to meter	BX-180	1	.0031	E ML
	Meter and Scale Simpson Model 27 SPCC 534	AM-2762			
	10 ohm 5MV Full Scale		1		
	Rheostat, Ohmite, 1 ohm, 50 watts, 0309	900348	1		
	Switch, Shallcross	BS-10413-B-6	1		
	Switch, S.P.S.T. H&H #20992 or equiv.	900410	1		
	Switch, D.P.D.T. Mallory #2006 or equiv.	1836	1		
	Knob	AM-1916	1		
	Knob, Kurz-Kasch, J-18	1928	1		
	Binding Post, Superior DF-30-BC	B-179589-006	4		
	Gasket, Rubber Channel, Black Atlantic	900563	30"		
	India Rubber	B-619			
	Hook-up Wire		2"		
	Wire, red battery Beldon 8899	900281	24"		
	Wire, black battery Beldon 8899	900279	24"		
	Shield, varnished cambric	AM-25511	2		
	Strap	AM-4233	1		
	Sleeve	AM-25513	2		
	Lug Solder	3025	2		
	Lug, Solder	3044	6		
	Washer, Cup #6	1761	4		
	Washer, fiber shoulder	1662	4		
	Washer, countersunk	AM-25512	2		
	Washer, 3/4 O.D. X 3/8 I.D. X 1/16 N.P.	1966	2		
	Lockwasher, Shakeproof 1/4"	900355	2		
	Screw, drive type U O X 1/4	900328	2		
	Screw, 6-32 X 1", O.H.N.P.	900324	4		
	Screw, 8-32 X 1/2 R.H. N.P.	900391	2		
	Screw, 1/4 - 20 X 3/4 F.H.N.P.]	900356	2		
	Hex Nut - 8-32 N.P.	3255	4		
	Hex Nut - 1/4-20	900271	2		
	Wiring Diagram	BM-25876	X		
	Schematic Diagram	BM-25450	X		
	Battery Lead Sub-Assembly	BM-25514	X		
	Carrying Strap Assy.for 3 pc. metal instr.Case	BM-2666	X		

ASSEMBLY DWG. NO. | PARTS LIST FOR SPARE PARTS 670-A MILLIOHMETER | ISSUE DATE

LISTED BY | CHECKED | APPROVED

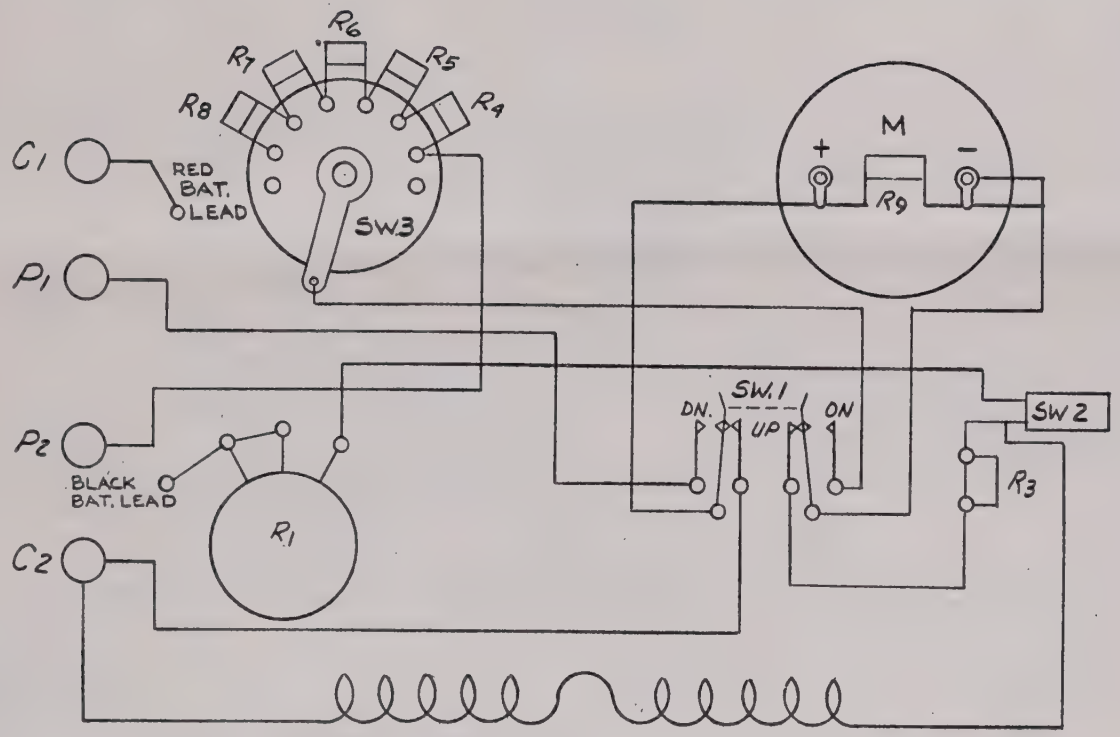
SHALLCROSS MFG. CO.
SELMA, N. C.

SHEET 1 OF 1

PL- 670-A

PL- 670-A SHEET 1 OF 1

REVISIONS			
LTR	DESCRIPTION	DATE	APP'D
A	REDRAWN 1296	3-5-63	Rca



NOTE:
SW. 1 IN "UP" POSITION. FOR VALUES OF COMPONENTS SEE SCHEMATIC.

QTY/DASH NO.	NAME	PART NUMBER	ITEM NO.
PARTS LIST			

MATERIAL -2-

FINISH -2-

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON FRACTIONS ± DECIMALS .XX ± .XXX ± ANGLES ±

WIRING DIAGRAM FOR 670-A & 670-B MILLIOHMMETER

SHALLCROSS MFG. CO.
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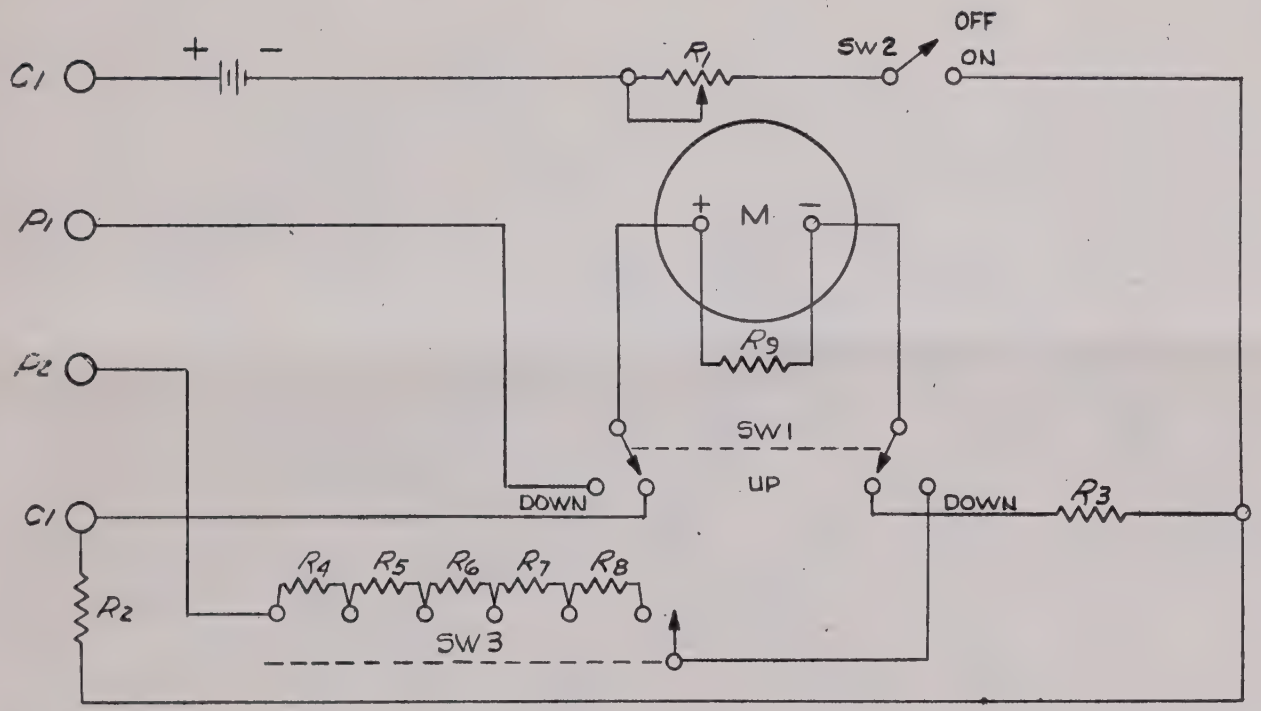
DRAWN	DURANSKE	3-5-63
CHECKED	Drat	3-27-63
APPROVED	Rca	3/27/63
SCALE	-2-	

B-M-25876

SHEET OF

REVISIONS			
LTR	DESCRIPTION	DATE	APP'D
A	REDRAWN 12966	3-5-63	R.D.



R_1 - 1	OHM	50 WATT POT	
R_2 - 0.15	OHM	0.5% MANGANIN BUS	
R_3 - 1300	OHM	0.1% T-180	NOMINAL VALUES CALIBRATED TO METER
R_4 - 40	OHM	0.1% T-180	
R_5 - 50	OHM	0.1% T-180	
R_6 - 400	OHM	0.1% T-180	
R_7 - 100	OHM	0.1% T-180	
R_8 - 2400	OHM	0.1% T-180	
R_9 - 100	OHM	0.1% T-180	

SW-1, YAXLEY PUSH SWITCH #2006.
SW-2, H & H S.P.D.T. TOGGLE SWITCH #20992
SW-3, SHALLCROSS SWITCH #4485-B6, TNR

QTY/DASH NO.	NAME	PART NUMBER	ITEM NO.
	PARTS LIST		

MATERIAL -N-
FINISH -N-
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON FRACTIONS ± DECIMALS .XX ± .XXX ± ANGLES ±

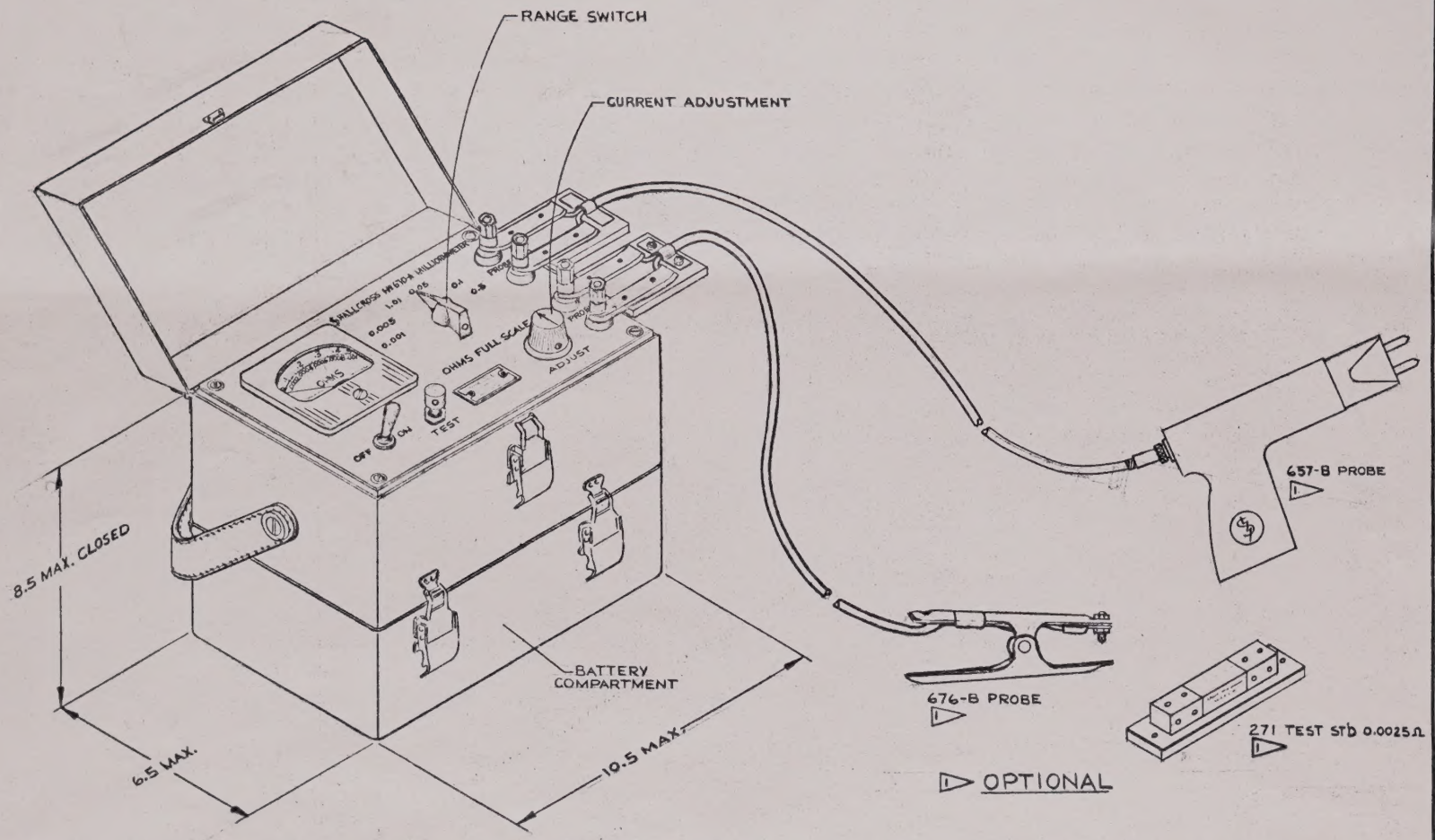
SCHEMATIC FOR 670-A & 670-B MILLIOHMMETER

SHALLCROSS MFG. CO.
SELMA, N. C.

DRAWN	DURANSICK	3-5-63
CHECKED	Dlott	3-27-63
APPROVED	[illegible]	3/28/63
SCALE	-(1)-	

B-M-25450
SHEET OF

REVISIONS			
LTR	DESCRIPTION	DATE	APP'D
—	RELEASED-ECN 18490	5-29-67	JDR



MATERIAL	SALES DWG. FOR Nº670-A TEST SET	DRAWN	EOT 5-29-67
FINISH		CHECKED	5-29-67
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± DECIMALS .XX ± .XXX ± ANGLES ±	SHALLCROSS MFG. CO. SUBSIDIARY OF CUTLER-HAMMER SELMA, N. C.	APPROVED	5-30-67
		SCALE	1/3 SIZE
		B-	182386
		SHEET	1 OF 1

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